

Claims:

1. Enamel composition for producing reflecting dielectric layers in plasma display panels, comprising as layer forming constituents 70 to 97% by weight of a glass frit composition having a softening temperature of less than 600°C and 3 to 30% by weight of a particulate whitening material, characterized in that the whitening material consists of at least 50 % by wt. of one or more thermally deactivated white pigments, 0 to 50 % by wt. of other white pigments and 0 to 20 % by wt. of one or more opacifiers and whereby the one or more thermally deactivated white pigments have been made by a process comprising heating of at least one white pigment in the absence or presence of a glass frit having a softening temperature of less than 600°C at a temperature of 600 to 1000°C for 0,1 to 10 hours.
2. Enamel composition according to claim 1, characterized in that the layer forming constituents comprise essentially 70 to 90 % by wt. of a glass frit composition having a softening temperature of less than 560 °C, 10 to 25 % by wt. of a deactivated white pigment which can be coated with a glass frit and 0 to 5 % by wt. of an opacifying agent.
3. Enamel according to claim 1 or 2, characterized in that the deactivated white pigment is made from titanium dioxide.
4. Enamel composition according to any of the claims 1 to 3, characterized in that the deactivated white pigment is made by a process, comprising transferring of a white pigment into briquettes, heating said briquettes at 600 to 1000 °C for 0,3 to 3 hours and crushing the so treated briquettes.

5. Enamel composition according to any of the claims 1 to 3, characterized in that the deactivation of the white pigment is made by a process comprising (i) preparing of a homogeneous powder mixture of at least 50 % by wt. of a glass frit having a softening temperature of less than 600 °C, (ii) transferring the mixture into briquettes, (iii) treating said briquettes at 600 to 800 °C for 0,3 to 3 hours and (iv) crushing the thermally treated briquettes.
6. Enamel composition according to any of the claims 1 to 5 characterized in that a glass layer made from said enamel composition by coating and firing has a breakdown voltage of greater than 400 V/25 µm.
7. Enamel composition according to any of the claims 1 to 6, characterized in that the glass frit composition is based on a lead borosilicate glass, essentially containing (wt.-%) PbO from 55 to 90 %, B₂O₃ from 6 to 35 %, SiO₂ from 6 to 40 %, CaO and BaO from 0,1 to 2 % and Na₂O and K₂O from 0,1 to 2 % and having a softening temperature T_s of 390 to 520 °C and a thermal expansion coefficient of (60 to 90) 10⁻⁷ K⁻¹.
8. Enamel composition according to any of the claims 1 to 7, characterized in that the layer forming constituents are dispersed in a liquid or thermoplastic medium.
9. Enamel composition according to claim 8, characterized in that it essentially consists of 60 to 80 % by wt. of layer forming constituents and 40 to 20 % by wt. of a liquid printing medium containing a polymer binder and at least a solvent system.
10. Method for improving the wettability of white pigments for using them in an enamel composition, characterized in that it comprises heating of a white pigment in the absence or presence of a glass frit having a softening

point of less than 600 °C at a temperature of 600 to 1000 °C for 0,1 to 10 hours.

- 5 11. Method according to claim 10, characterized in that it comprises the steps: (i) transferring of a white pigment into briquettes, (ii) heating said briquettes at a temperature of 600 to 1000 °C for 0,3 to 3 hours and (iii) crushing the so treated briquettes.
- 10 12. Method according to claim 10, characterized that it comprising the steps: (i) preparing a homogeneous powder mixture of at least 50 % by wt. of a white pigment and up to 50 % by wt. of a glass frit having a softening temperature of less than 600 °C, (ii) transferring the mixture into briquettes, (iii) heating said briquettes at a temperature of 600 to 800 °C for 15 0,3 to 3 hours and (iv) crushing the so treated briquettes.
- 20 13. Process for enamelling a glass substrate, comprising coating the substrate with an enamel composition consisting essentially of glass layer forming constituents dispered in a liquid or thermoplastic medium and firing the coated substrate on a temperature in the range of 600 to 680 °C, characterized in that an enamel composition as to claim 8 is used.
- 25 14. Process according to claim 13, characterized in that the coating is performed by screen printing followed by drying.
- 30 15. Plasma display panels comprising a first array of electrodes embedded in a dielectric layer on a rear substrate, a second array of electrodes embedded in a dielectric layer on a cover substrate and a pattern of a barrier for defining discharge spaces in between, characterized in that the dielectric layer on the rear substrate is a reflecting essentially white enamel made

by coating the substrate with an enamel composition according to any of the claims 1 to 9 and firing at a temperature in the range of 600 to 680 °C.

Summary

The invention refers to an enamel composition for producing reflecting dielectric layers in plasma display panels, comprising as layer forming constituents 70 to 97 % by wt. of a glass frit composition and 3 to 30 % by wt. of a particulate whitening material. The whitening material comprises one or more thermally deactivated white pigments, which have been made by a process comprising heating of at least one white pigment in the absence or presence of a glass frit having a softening temperature of less than 600 °C at a temperature of 600 to 1000 °C for 0,1 to 10 hours.

The invention further refers to a method for improving the wettability of white pigments by the above said thermal treatment.

15 The enamel is used for producing a reflecting white dielectric layer in plasma display panels.